minus, uses the oxide of manganese, which has the property of giving off its oxygen very slowly. An excess of manganese gives to glass a purple tint, and where altogether absent the glass is always green.

Having thus called attention to the peculiar composition and mode of manufacturing flint-glass, he proceeded to describe the changes which take place in the colour or tint of glass, and the methods employed by the glass-manufacturer to convert the mass from a green, purple, amber, or other tint, to a pure or colourless metal, and brought forward examples tending to prove that the changes in the colour of the glass are due to the presence or absence of a given proportion of oxygen. Manganese, as a metal, gives no colour to glass, although by the oxygen it yields to the lead in the mixture, a purple colour is produced, because by reducing the quantity of oxygen, either by pulling or subjecting the glass to a long-continued heat, or by submitting it to the action of carbon, the purple colour is removed, though the manganese still remains. Iron and copper also assume different colours when combined with different proportions of oxygen. If this be true, may not all colours of the oxygen of other metals, such as iron, copper, and lead, be due to the combination of certain proportions of oxygen with the metal or metals present, so as to induce a particular molecular arrangement, from which the glass has the power of absorbing a particular colour?

THE MANCHESTER SCHOOL OF DESIGN.

At the annual meeting of the Manchester School of Design, held on Tuesday in the week before last, the Bishop of Manchester, who presided, said the advantages of schools of design, in whatever point we looked upon them, stood out pre-eminently conspicuous. Whether we regarded them as a means of improving the manufactures, and consequently the trade of this country,—there they stood pre-eminent; whether we looked upon them as means of raising the lower classes in the scale of civilisation,—there again they were most effective; whether we regarded them as a means of opening a source of happiness to every class of our fellow-creatures, who had hitherto had the study of art placed out of their reach,—there again they were most valuable. But he could take even higher ground. He had found, from experience, the school of drawing and design most valuable in providing a means of innocent, useful, and valuable instruction to the lower classes, at a time when temptations of a diametrically opposite character were calling them from their homes to vice and indulgence; he had found that, independently of enabling them to carry home a new feeling and sensation to their dwellings, it had rendered them more keenly alive to the beauties of nature, and more capable of understanding and admiring the wisdom and benevolence of their God.

The report, which was read by Mr. Gregan, expressed regret that the great body of the manufacturers engaged in that particular branch of trade to which the school is so decided an auxiliary, still continued to manifest so small an interest in its proceedings, and to contribute in so slight a degree to its support. "We are all sensible enough of the importance of good design in our industrial productions, and it is surprising that so little pains should be taken by those most nearly concerned to secure it. In many cases, indeed, corporations and town councils have publicly supported these schools, while, in the manufacturing metropolis of England, no public aid whatever is granted to an institution, which, if endowed with more extended means of usefulness, is calculated so much to enhance the commercial value of our manufactures."

From the treasurer's statement it appeared that the receipts for the year ending December 31, 1848, were:—Government grant, 390*l.*; annual subscriptions, 302*l.* 8s.; students' fees, 142*l.* 10s.; fees from private classes, 87*l.* 3s.; balance due to treasurer, 212*l.* 1s. 11d.; total, 1,134*l.* 5s. 1d. The expenditure amounted to 1,134*l.* 5s. 1d., of which the principal items were:—salaries of masters, 465*l.* 17s. 9d.; secretary's salary, 50*l.*; rent of rooms, 220*l.*; printing and advertising, 41*l.*; gas rent, 50*l.*; books and works of art, 31*l.* 10s.

Mr. F. C. Calvert contended that the School of Design had not hitherto flourished, simply because of the system of working adopted, which he believed neither met the hopes of the pupils nor the wishes of the supporters. He suggested that, after three years' study, five of the most proficient pupils in the institution should be selected, to whom assistance should be given if they were not able to support themselves, while they were advancing themselves in their studies; afterwards the most proficient of them should be sent upon the continent, under the protection of the school, to study in France, at Rome, or any other great centre of art, where those arts might be cultivated which would be most beneficial to that district.

ARCHED BRICK FLOORS, BIRKENHEAD.

In a report, in your valuable journal, of the paper read by Mr. Rawlinson, that gentleman, quoting from a manuscript by Mr. Chadwick on the improvement of building materials, mentions that the floors of the "improved dwellings for workmen erected at Birkenhead were constructed of brick, in flat arches about 6 feet span. The spaces between the upper part of the arches and the spandrels were filled in by mortar, on which flat tiles were imbedded."

As the architect of these dwellings, which were designed by me and commenced in 1845, you will perhaps allow me to make a slight correction in this statement. The arches, some of which were 7 feet in span, were turned in what is termed half brick, except at the springing and the skew backs. I caused also a certain number of three-quarter and other parts of bricks to be inserted, so as to form a toothing or vertical bond with the *concrete* with which the spandrels were filled in, and *not with mortar*. The six or seven crown courses were wedged in with slate while the mortar was wet, and the consequence is, that in no one instance has the least subsidence taken place at the crown, although subjected to very severe trials,—the stairs having been used by the labourers for carrying up all the materials, and the men often jumping from the walls upon the arches. I think, however, 7 feet is the limit of a half-brick arch turned in mortar with the ordinary rough brick. The arches rise about one inch to every foot in span. The tiles were laid in mortar on the concrete, which made the thickness of the floor at the crown of the arch about 5¼ inches. There were altogether about 1,200 arches of this kind turned, and without the slightest accident.

Chas. Evans Lang.

USE OF HOLLOW BRICKS.

As much attention has been drawn to the subject of hollow bricks or pots, by your notice of the erection of the great arched ceiling at Liverpool, I beg to observe they were, I believe, first introduced in England about 55 or 60 years ago, by Henry Holland, the eminent architect of his day, at Drury-lane theatre, Carlton House, and other of his buildings.

I am not aware of any reason for their not being generally adopted, but that they were probably more expensive, and also were something out of the common way, and required more attention and care in execution, and therefore gave trouble to the operative builder, who would in consequence perhaps discountenance and shirk them.

The building world was sleepy in those days compared with the present, and were content to follow in the footsteps of their forefathers without much thought. But "we have changed all that," and as in the political world so in buildings, there is a rage for new things, and the difficulty is in steering clear of extremes. "There is a moving power and a steadying power—there is the sail and ballast; without the former there would be no progress, without the latter little safety." This has been said in a well-known Review of Whig and Tory in politics, and may be applied to all matters where much change is contemplated.

With reference to large arches, it may not be irrelevant to observe that the Adelaide Gallery, in the Strand, is arched with three or four courses of plain tiles in cement, forming at once roof and ceiling. It was thought a bold novelty at the time, and particularly as it is perforated with circular openings for skylights.

This was done, I believe, by a builder, Mr. Herbert; the principal thing, however, that the world looks at is

"Non quo sed quomodo."

COMMONS' COMMITTEE ON SCHOOLS OF DESIGN.

On Friday, the 27th ult., the examination of Mr. Stafford Northcote was resumed. It was somewhat vague. He knew nothing of the proportionate value or importance of the various classes of manufactures in this country. He approved of public exhibitions of designs, but there had been none for more than two years: they had been overlooked. Mr. Poynter followed. He thought the provincial schools "mere drawing schools," as late as 1847; but that this defect was remedied by Mr. Wornum's lectures, and he could suggest no further improvements.

On the 30th, Mr. Dyce was examined. He showed, that at one time design was really cultivated in the school, and then abandoned. He thought the present system impracticable, and had resigned in consequence. The present committee of management ought to be changed. The responsibility was divided and uncertain. Mr. J. C. Horsley, formerly a master, followed. His evidence proved that the present system was wrong and impracticable, and that he had resigned because he found it so. There had been coostant changes and no fruits.

May 2nd. Mr. Wakefield, one of the largest garment fabric printers at Glasgow, proved that the school had not influenced the designs in his trade. He was friendly to the schools; but thought them failures in that respect. The masters ought to know the practical working of manufactures. The evidence of Mr. Nickisson, an agent for manufacturers, was to the same effect: he had been a student in the school for five years, and did not think "design" was properly taught.

RAILWAY JOTTINGS.

That tricks *can* be played with railway tickets appears but too plainly, from the detection of a clever system of fraud practised on the Yorkshire and other lines, by a traveller to a London chemical firm. He appears to have been allowed to retain his legitimate tickets by wholesale, eighteen having been found in his possession, with chemical erasures ready for future occasions, besides an altered one, by means of which he was detected. Types were also found in his pocket. With these he appears to have managed to make all the requisite alterations which enabled him to 'come over' the officials again and again in his travelling trips from one town to another. The only question in his prosecution was whether to charge him with fraud or forgery, for the latter of which it was ultimately decided that he shall stand his trial at the next York Assizes.——Another system of fraud with tickets by conspiring officials themselves was lately discovered on one of the Northern lines. By connivance with the issuer of the tickets, a guard returned so many to his confederate at every trip for reissue, the parties sharing the proceeds between them to a heavy amount.——The London and North-Western Company conceiving themselves entitled to open carriers' parcels of parcels, and charge separately for each separate article in the aggregate package, did so in the case of a Mr. Crouch, who brought an action against them lately at the Warwick Assizes. The Judge (Chief Justice Wilde) said the defendants were bound to charge an equal price to all alike, and he could not see what other conclusion could be come to but that in the present case they had made an excessive charge. Verdict for the plaintiff; damages, 49*l.* 4s. 2d. A special jury case, in the Court of Exchequer, stands adjourned to Trinity term, in which Mr. Crouch, the plaintiff in this action, sues the company for special damages.——In a case of compensation at Bradford, to Messrs. Ripley,

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